INERTIAL CONFINEMENT FUSION
Lawrence Livermore National Laboratory

Monthly Highlights

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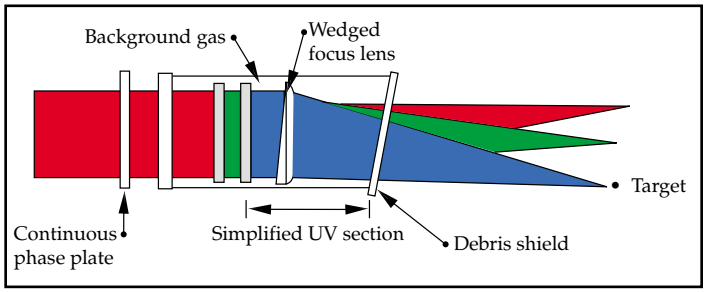
Target Chamber Shielding Installed. The exterior surface of the National Ignition Facility (NIF) target chamber has been covered with 40 cm of sprayable concrete, called "gunite." The gunite will serve a dual purpose during yield operations—it will reduce the neutron fluxes on components and structures outside the target chamber and protect personnel from gamma-ray fluxes. This shielding includes a boron additive to capture low-energy neutrons.

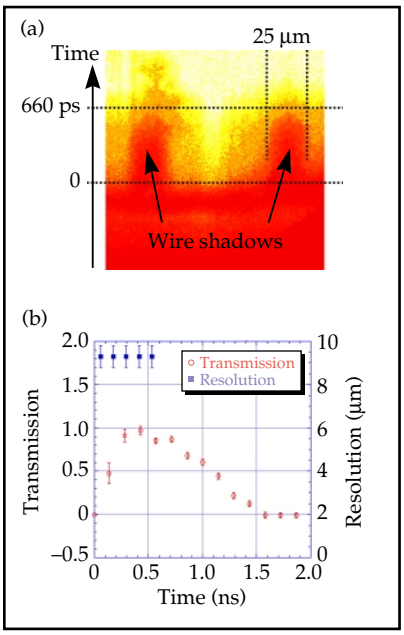
Gunite, a sprayable concrete, being applied on the NIF's target chamber exterior.

A Reconfiguration of the FOAs Aims to Correct Beam Orientation Problem. Recently we discovered that the arrangement of the NIF final optics assemblies (FOAs) when mounted on the target chamber would not exactly match the orientation of the beam arriving from the final turning mirrors. Redesign of the FOA to include a wedged focus lens will solve this misalignment, as well as eliminate the need for a color separation grating in the FOAs (see figure). This change in the lens design will require modifications to the design of other hardware in the target area, such as the relocation of the final turning mirrors, and rerouting of various utilities. A design to incorporate these changes is under way.



NIF's reconfigured final optics assemblies include a wedged focus lens.

Point-Projection Backlighting a Tool for Imaging NIF Targets. Pinhole-assisted point-projection backlighting has been previously demonstrated using 25- and 50-μm pinholes, but many NIF experiments require better resolution (10 μm or less). The key issue was the degree to which the backlighter x-ray source placed only 1 mm away (for providing a large field of view) would vaporize the pinhole substrate and close off the pinhole prior to completion of the experiment. Experiments on the OMEGA laser at the University of Rochester Laboratory for Laser Energetics have demonstrated 9-μm resolution pinhole point-projection imaging by 25-μm-diam tungsten wires [see Figure (a)]. Streaked 120× magnification images of the wires show pinhole closure only beginning after 500 ps [see Figure (b)], hence providing plenty of time for a backlighter snapshot.



(a) Images of 25-μm-diam tungsten wires with 9-μm resolution. (b) Plot of 10-μm tamped pinhole transmission, 1-mm pinhole-to-backlighter distance, and 0.5 TW on Ti backlighter.

NIF's First Major Beampath Infrastructure Contract Up for Bid. Final design for Construction Subcontract Package 13 (CSP-13) has been released to the Lawrence Livermore National Laboratory's Procurement Department. It has been prepared following NIF Project Procedures and submitted through the NIF product data management system for approval and document release. Procurement is in the process of inviting bids, which are estimated to range between $4 million and $6 million.

The work in CSP-13 is to set and align 24 large (50,000 kg) laser bay vacuum vessels and many other support structures. The chosen contractor will furnish labor, material, equipment, tools, and services required to transport, install, and align the government-furnished equipment and associated equipment in the two laser bays of the NIF. The package requires verifying embedment locations, setting and erecting equipment, precision alignment, structural fabrication, and installation of various components.

For comments about content of the *Monthly Highlights*, contact Bob Kauffman (925) 422-0419.
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